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Attention.

A Historical Summary of the Various Discussions of the Subject.

A dissertation presented to the Johns Hopkins University on application for the degree of Doctor of Philosophy, by

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Introduction.

The history of an idea as it runs through the ages is an object of scientific investigation. Such an account is far more interesting and important than the biography of one individual's life, first as it includes, in different shades and contrasts, the combined thoughts and lives of many men of different times. In attempting to trace the various ideas concerning Attention two historical observations may be made. On one hand, a thing or fact must first have been long known before the human mind carefully examines it; on the other hand the thing or fact is variously regarded in the different ages. The fact of attention attracted ancient writers, but there was scarcely any discussion of it, as far as we can gather, and even those of the Mediæval ages have nothing more definite recorded concerning it. The word was in use and is found enough in the writings which are preserved, but such subjects as Sensation, Imagination, Memory, Knowledge and Soul were of so much greater importance as to command the thought and the study of the early

day. When, at a comparatively recent date, the subject was taken up by some of the writers, it was omitted by many others. The works on Mental Science and on Psychology in our day have all something, and some of them very much, to say about attention, but this was not the case in the psychological and philosophical writings even in the XVIIIth Century, not to mention earlier periods. It is no wonder, then, if attention has been variously described and classified.

In the many and apparently conflicting theories on the subject, which we shall meet, there is throughout a dualistic conception all the time expressed, even where it is avoided or strenuously denied. This dualistic view we aim, in our presentation of the subject, to point out and keep clear without, however, wishing either to force men's opinions out of their natural shape, or to make a mold that shall fit them all. Some sort of mold was already there in the experience of each writer himself and in his constitution as man. We shall strive to use the word physiological, where the theory properly expresses any reference to the body,

sized and also is always connected with attention, and the end of will is some kind of pleasure. It is also stated more fully than Plato that those impulses from bodily stimulus are not under control that those impulses from thought are subject to volition, but in studied Plato's views physiological statements. We also noticed an interesting point in indicating that we can have but one object at a time in the higher faculties of the mind. We [illegible] to the [illegible] by, while Plato conceived it to take place in the Physics.

We may summarize what we found as follows:— Aristotle recognized attention as initiated by the feeling aroused in impulses; also as a conscious discrimination, one at a time, of the varieties of sensation present in the process of perception; and as voluntary activity in reflection and deliberation.

It is worthy of notice, also, in concluding the views of [illegible] and Aristotle, some [illegible] of [illegible] thought [illegible] of the [illegible]

and mental representations. [illegible] account of this process, if we except Plato's inhibition of sensations through the preoccupation of the mind by the abstract reasonings in mathematics.

One of the phases of attention discussed in the period under review was that pointed out by Cicero in its relation to memory. In this discussion Cicero came first.[3]

Cicero deplored the antagonism which had arisen between the views of philosophers regarding sense and [illegible] senses", he considered it to be active, directed towards what moves it, "seizing" and appropriating the same. In those ages they knew nothing of the finer anatomy of the [illegible] from central effects, so that Cicero, and those whom we are now considering, did not distinguish sensation from impulse nor did he regard the physiology of the [illegible] ence [illegible] in respect to memory and habit. [illegible] ficiency and continuance of [illegible]

3. "Academica" Lib. II, VII and X and "De Senectute."

[illegible] and [illegible]. [illegible]
[illegible] of [illegible] and [illegible] [illegible]
[illegible] Attention and Memory. [illegible]
[illegible] and [illegible] in my [illegible] of [illegible]
Attention, and in his views of its relation to memory
and evidence his conceptions, [illegible] may say that
[illegible] considered attention to be a psychical act, and
as a psychical [illegible] it [illegible] a physiological [illegible]
cian in old age.

He did not know whether Cicero considered atten-
tion [illegible] to memory, [illegible]
did for old age. The question was taken up by Quinc
ilian who not only treated of attention in memo
[illegible] but discussed the subject, and [illegible]
points concerning it.[4] He pointed out the value of at
tention in memorizing and appears to be earliest to
[illegible] this principle. [illegible] discovers it to be [illegible]
[illegible] concentrated attention as even less than necessary

4 Institutes, Lib. X, cap. III, 3

ment of the matter to be examined and the proper mode of practice and exhibition is one of greater importance than attention. He perceives how we could explain what he called "arrangement of matter" under judicious association, and how practice and repetition are general observations of attention, and he shrewdly said that "a greater degree of attention" is acquired by practice.

Turning to other features of the subject, Quintilian appears to be the first to have used the simile of dividing the mind [illegible], which figure as applied to attention has now become a classical metaphor in psychology. [illegible] of the mind [illegible] that many sensations and objects can be attended at once. One of his examples is that of the teacher who sings to the lyre and thereby attends simultaneously to sensations of sight, sound and touch. He was especially emphatic and asserted that when there are several objects of sensation at once the mind can be confined to one only. "For it is not [illegible]

subject with a lecture on it. But of course any thing of health and digestion is a good memory, he unfortunately included its good effect or attention, though we must not insist on this point.

We may summarize, that Quintilian discussed attention in its relation to memory more clearly than any of those before him, yet still not as complete and comprehensive, that he considered [illegible] more important, and that he was the first to advance distinctly to the two great ideas — the necessity of the mind's not attending and the consciousness of several objects at once.

A step in advance of Quintilian was made by Augustine[5] who more clearly outlined the processes of attention in memory, naming [illegible] subject called "[illegible]" Augustine contended that the natural observation [illegible] tion of ourselves upon the object and that this concentration connects the object [illegible] ready in the mind, and so [illegible]

5 Confessions, Lib. X, secs. 12, 13, 15 and 18.

mind. ... mind holds ... something desired to be recalled, and engages ... without restlessness thoughts and images until the desired end is gained. ... find the idea ... very different from that hinted at by Plato and Aristotle, and after an interval remarkable for ... scientific outlines of psychological facts which modern ... have filled in, ... exhibitory factors in attention. It must be remarked, however, that, like Augustine, Aquinas treated of attention as a very secondary subject, and we only gleam that he called it an active psychical operation, associating ideas and images for memory and exhibiting ideas and images in recollection.

Lord Bacon has given his contribution to the ... attention and memory in the ... but it is better to take up another ... already occupied by earlier writers.

What was the progress of the discussion during the ensuing
[illegible] to [illegible] to [illegible] I do not
to be ascertained more was not said or written than what is
[illegible] in this chapter, but it is believed no other con-
clusions were [illegible] more serious [illegible]
than what will now be enumerated. [illegible] This is one
of subjects that was occasionally talked of [illegible]
occasion of itself whether as a specific act, state, series of
acts or [illegible] of both. [illegible]
matter of surprise, but there were so many subjects of discus-
sion that [illegible] for us, there were so many
unsettled questions which are no more [illegible]
that it was [illegible] from the [illegible]
ours, confirming the fact of discussion on the part of both
sides. Seeing that the subject [illegible]
[illegible] [illegible]
day, it is [illegible]
more centuries wherein there was [illegible]

by reflection on mental acts (So Plato, Aristotle and Augustine); 2, this voluntary reflection inhibits sensations from without (Plato [illegible]); [illegible] the [illegible] of being [illegible] in the [illegible], and, [illegible], [illegible] (Plato [illegible] [illegible]), [illegible] [illegible] [illegible] [illegible] [illegible] and [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]); 5, it is a [illegible] of sensations (Plato and Aristotle); 6, it gives the [illegible] [illegible] [illegible] (Plato), 7, it [illegible] as [illegible] [illegible] (Plato and Aristotle); 8, it can be [illegible] to one [illegible] only (Aristotle, Augustine), or [illegible] to several objects (Ramus, Duns Scotus); and finally, 9, attention is a [illegible] of objects [illegible] [illegible] (Dumbleton).

It will thus be seen how many questions have [illegible] [illegible] in a vague way, the aspects of the subject in their [illegible]. The [illegible] [illegible] points are these: — Attention as an act of mind, 1, is a feeling of motion, 2, can be directed either to one object only, as said some, or can be directed to several objects at once, as said others, and 3, both fixes the object in memory and aids in its recall. It is noticeable that all these conclusions are those given in introspection.

Book II.

Theories of Attention from the [illegible] to Ferrier.

In entering upon the period of more recent psychology, [illegible] to [illegible] Psychology, and to show more particularly [illegible] the connection of the Psychology of [illegible] Great [illegible] centre of the period as regards [illegible] time of Reckoning.

[illegible] to mean any presentations in the mind, and [illegible] 'mental' always a contrast to the terms of matter. [illegible] motives as polygenetical, the phenomena [illegible] Emotions from two objects are produced in the mind [illegible] nerves, and the two impulses thus started [illegible] one presentation, the character of the [illegible] determined by the more powerful impulse [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

this view to an earlier [ion] view of Aristotle and Aquinas, that the [illegible] in the [illegible] presents to the [illegible] object [illegible] of its intellect, and this object can come by external impulses or internal [illegible]ation.

[illegible]

main point of his theory centers in the psychical feature, the contribution of the so called "animal spirits" in the [illegible] to [illegible] [illegible] picks up a constant and regulated train of thought and [illegible] end, thus guiding and concentrating the [illegible] [illegible], of course, the [illegible] and effect, but the [illegible] of [illegible] the inhibition connected with this is his contribution to the subject of attention. [illegible] clearly in the discussion of deliberation. [illegible] the mind is [illegible] [illegible] "appetites" and "fears", the limit of this motion is [illegible] by the ex-[illegible] [illegible] the mind [illegible] to [illegible] and concentrate [illegible] [illegible] which [illegible]

[illegible] it is necessary, then, to follow out the body
[illegible] must be in the state of [illegible]
nurturing everything that is in the world, and also the
[illegible] of [illegible] Lungs [illegible]
[illegible] by, for [illegible] the
[illegible] the Nerves, our organs receive impressions of an [illegible]
[illegible] and purity and [illegible] of [illegible]
[illegible] there is also a seasonal accommodation of impressions
[illegible] Limits did not admit any gas or vapour in the
[illegible] any part there to [illegible]
[illegible] on the surface of [illegible] the
[illegible] on the side of [illegible] [illegible]. He illustrated
[illegible] to the impulses by the [illegible]
[illegible] of [illegible] by the increased [illegible] any impressions
[illegible] [illegible] [illegible] [illegible]
[illegible] side, there is [illegible] with every effort [illegible]
[illegible] there are [illegible] of [illegible]
[illegible]

[illegible] Book [illegible], Book [illegible],
Chap. II., Ch. XI, XIX; and Proverbs to the [illegible] of Chapter

ject of attention, and, as already limited, treated it in its extensive relations to pleasure and to pain. Like Quintilian, he used the figure of the limited eye, to represent attention as the fixation of the mind upon its objects. As indicative of the exact [illegible] of mind [illegible] or satisfaction, he employed the word [illegible]

4 Oeuvres; Rec

tion [illegible] [illegible] [illegible] [illegible], indeed is all prevailing, in attention, and controls it completely, for attention is act of will and will is controlled by interest. Locke bases his look more primarily about that interest controls attention than he did to show that it controls will. Locke followed with the discussion of the [illegible].

In considering the physiological causes of attention, [illegible] confounded these causes with the accompanying feelings in consciousness, and thus made the inducement in the objects stimulating the organs to be an additional interest leading to the act of attention. He also introduced a long discussion of the sense impulses as grounds for feelings of pleasure and satisfaction beyond all [illegible] [illegible] [illegible] [illegible] [illegible]

pleasant ~~plea~~ feeling from reasoning and imagination, but a great deal from sense-excitations, hence [illegible] control the sense in [illegible] attention, [illegible] [illegible] [illegible] is that direct sensations are [illegible] mind" and "fill its capacity," [illegible] that direct [illegible]

fig.

[5] Essay

[illegible]

the [illegible], [illegible] which [illegible] is the [illegible]

[illegible] "[illegible]" and [illegible]

[illegible]. [illegible] complete determination of [illegible]

through the sensory nerves and [illegible]

[illegible] that everything in mind comes from [illegible].

In this view, attention is a receptive faculty, admitting what is [illegible] to the organism and thereby securing a consciousness of it, while it is also the first step to knowledge. [illegible] the sensory factors and their equivalents in consciousness are here emphasized, the motor factors are duly regarded by the following [illegible] of [illegible].

We must now include David Hartley whose view is an interesting extension of that of [illegible], though [illegible] [illegible] to attention is [illegible], as [illegible] [illegible] will [illegible] said more on the subject.

With [illegible] to the physiological [illegible] of the theory, Hartley[8] [illegible] on our subject, [illegible] the [illegible] of attention [illegible]

[illegible]

8 "Observations", Prop. VII [illegible]

[illegible]

attention is the stronger sensation.

One [illegible] in contemplating [illegible], but the notion was first hinted at by [illegible] [illegible] simply [illegible] in [illegible] ago [illegible].

Chas. Bonnet[10] claimed that he was the first to assign attention and to [illegible] different influences on the varied abilities of mankind. He [illegible] considerable analysis, but the latter part of his claim may be doubted in the light of what Helvetius had written at very nearly the same time. Dealing almost entirely with the physiological side of the subject, [illegible] which he applied in general Geology ([illegible] distinct subject), he aimed to reduce all facts [illegible] simple principles and [illegible] different forms. [illegible] Faculties [illegible] influence [illegible] and activity of mind", [illegible]

[illegible]

10 "Facultés de l'Âme", [illegible], XII, XIII; Essai sur les facultés, [illegible] I et XX–XXI; Essai de Psychologie, [illegible], XII, and [illegible].

that we may attend several objects at once, limited by the number six.

[illegible] have learned [illegible] remarkable [illegible] great power of attention, and this attention must have [illegible] many [illegible] [illegible], and we have a power which, [illegible] [illegible], could bring them to the highest [illegible] development. The power is not exercised alike in all [illegible] sensations, likes, dislikes and needs, but its exercise [illegible] [illegible] [illegible] [illegible] [illegible] the intellectual feelings and emotions. He made a novel contribution to the subject by placing the function of attention [illegible]

With [illegible]

mind, explained by my distinction between the
[illegible] attention, and [illegible]
to differences among mankind in skill, intellect and
genius. For Condillac's faculty we have a power va-
riable of immense development.

A Destutt de Tracy[12] went further, but
not much further than Condillac's "faculty of attention" and
also [illegible] that there is any distinct operation assigned. It
is a state occurring when difficulties in the operations
of the mind are overcome by [illegible] Especially
[illegible] and we can [illegible] by the
three agents, the sensations which are received and re-
[illegible] The treatment of the subject
is rich with the conclusion that attention is a state
of will in which sensations are possible, and [illegible]
at once.

[illegible][13] [illegible]
of Condillac. [illegible]
[illegible] to [illegible]
[illegible] "Attention" [illegible]

[illegible] Revue Philosophique, Tome V, pp. 378.

...ecte ... must consequently be ... [illegible] ... d
...self's doctrine and made activity to consist of ...
...me all the various vices from the animals; at this period
...attention is first, and attention is the basis of all the
...intellectual operations. Activity characterizes all human
...and ... [illegible] ... [illegible] ...
...ion, and similarly the basis of such action [illegible] of operation;
...as the sensibility and the will.

We may say that, according to Lamennais,

...[illegible] ... [illegible] ...

all activities are at the foundation of other divisions of the
...[illegible] ...

J. F. Thurot followed

...[illegible] ... [illegible] ...

...act ... affair, but chiefly from Lamennais in considering
...as the chief element to be that of will. It is either cause
...or consequence of feelings. This is the idea as a transcendental fact often omitted, viz: that feelings both
...precede and follow certain acts of the will, and when
...a deeper field of [illegible] ...

14 "De l'entendement," tom. I., ch. 1, art. II, etc.

Our views of
Locke's doctrine of ideas, together with the two Dutch divines
[illegible] included here, are open to very fruitful of results. It was
[illegible] considering a thing as, primarily, a
a faculty of consciousness, a Sensation, a Motor Act, a
Power, and a State of Will. The views have been clearly dif-
ferentiated from that of Hobbes, Leibnitz and Wolff, by the
emphasis placed upon Sensations, vibrations and impulses,
and by the omission of the German idea of the unconscious
basis of consciousness. Before we leave again to another
phase of the German Schools of thought, it is profitable
here to give an exhaustive view of the peculiar ideas
Reid and Stewart, including a reference to two other

The conception of Common Sense[15] is one
which is among the first expositions of a large number
of Scholars who have studied and theorized into the
old Hypothesis. The primal faculty, perceiving, and know-
ing together, intuitively and consciously, as
a power of consciousness and

[15] Reid's Inquiry, pp. 117, 131.

come current and this is best examined in words of
American writer.[16] The mind fixes its notice upon objects
attaching us expressly, and the agreeable is the exclusive
limit test. "Attention is a turning of the faculty"
by which any person or object comes the whole mass
are excluded to view." "But this is a part of the
process of [illegible] the ideas of

"Light of Nature." Vol. I., Ed. 28.

Essay"; Ch. II. Sec. V. and "Essay", Chaps. I-III.
Powers"—Essay II., Chap. XI.

shall see.

[illegible] of [illegible]

[illegible] by [illegible], [illegible] said [illegible] subject, but [illegible] in many [illegible].[1] [illegible]

The [illegible] of pure reason into its [illegible] forms [illegible] sensations and the [illegible] of these again [illegible] among [illegible] of the faculties in the mind. [illegible] looking at our minds through reason and experience gives us two views of attention. Critically, and [illegible], attention is a distinguishing faculty, one of the [illegible] conditions of the intellectual faculty, and necessary in the [illegible] of intuition. In experience, the act of attention becomes an object of perception. Thus far, we may [illegible] the general statements of Kant. In particular, he said, it is an effort to become conscious of the sense stimuli, and this is to be distinguished from the effort to become conscious of a reproduced sensation in memory. [illegible] and others had termed the effort to [illegible] reproduced sensations an act of [illegible], Kant called it [illegible]. [illegible]

1) "Logik", Elementarlehre pp. 25 [illegible] and [illegible]; [illegible] "Anthropologie", Buch I Sec 3, 6 and 13.

Helvetius

gainst those who depreciated the senses, denied that they are the great sources of errors, and accounted for our having learned concerning all things without us by the mistakes of the judgment regarding sensation. This mistake is certainly true of the assertion that attention becomes correct but only when void of the impulse; and that impulses are never false.

identifying it with conation [illegible]. [illegible] have called attention [illegible] to distinguish, since [illegible] [illegible] become one of the [illegible] [illegible] in experience.

It is very difficult to ascertain where J. G. Fichte[20] assigns attention in his theory of the Ego and the Non Ego, although he often uses the word mainly in the ordinary sense of a direction of volition. As there are leanings in this system that bring us near the point it is well to sift them and see the results. The Ego posits a Non Ego which is but a limitation of the Ego so that it returns to itself as another Ego. In the Non Ego it posits an impulse which is also but a limitation of the Ego, and this too returns to itself as another impulse. The impulse is will which is unaccounted for except by inference as an activity of Ego. In the form of the limited impulse, that in the Non Ego, it is called feeling — the sensation of matter, and as it returns on the Ego is an impulse of [illegible]. In this [illegible]

20 "Wissenschaftslehre" and "Die Thatsachen des Bewusstseins".

[illegible]

[illegible] through the [illegible] coming home again [illegible]

[illegible] only in [illegible] the idealistic notion that the mind has the [illegible] share in the origination of those impulses, and this is the best we can make out of his reference.

On leaving [illegible]

Hegel[21] whose reabsorption of the ordinary in the [illegible] head by a new system makes all things to appear different, we meet the activity of attention under the guise of one of its many moments of thought. The [illegible] truth of the universe, and attention [illegible] of its phases, errors, is selections of the [illegible]

[illegible]

[21] Logique, Vol. I, Philosophie des Geistes, Sec. 465-468.

just give the complete nature and fact for the action and instinct is required more. Hegel called it act of reflection. Action, reflection does not give an object as an image or abstraction to the mind but gives a sensation, projected into act and, in this process of it, a preparation for the operations of imagination, memory, judgment and reason.

Attention is also somewhat dependent on the will, and I have to remind you of what I have said in place the sketch of attention as a perception of a sensation. It is noted and that attention makes the simple and individual sensation to become universal because of the reference to the one and only standard of the person. This is the connection of the attention with the universal and the [illegible] of an attention to the [illegible] and universal according to the phase of the subject.

In this way the theory of the movement of attention, that is not the notion as acting, runs into a self-determination of this notion into the factors the notion out of itself and it

[illegible]

Herbart[22] has given us new conceptions [illegible] metaphysics on the one hand and [illegible] are grounded in reality. On the practical [illegible] also [illegible] of which the [illegible]

[illegible] Baird [illegible]

z) Band II. Sec. 128. a) Band II. Sec. 42.

[illegible]

[illegible]

[illegible]

[illegible] Schopenhauer[24] [illegible]
[illegible] will [illegible] primum [illegible]

[illegible]

[illegible] considered attention as an act of will [illegible] the faculties [illegible] attention, not to [illegible] outward — [illegible]

[illegible]

[illegible] the subject of attention [illegible] Schopenhauer. His remark [illegible] fields [illegible]

[illegible]

24 "World as Will", Vol. II. Ch. [illegible]

c) is caused by nerve impulses, eg arises either a certain sequence of stimulus or a certain number of stimuli (Wundt, Wolff, Herbart);

d) depends upon the harmony of an impulse with all, or most previous nerve impulses (Wolff, Condillac, James Mill, Bonnet, Herbart, Wundt);

e) fatigues the nerves and muscles (Bonnet);

f) prolongs the duration of the impulses (Bonnet);

g) is increased by practice and sharpens the organs (Bonnet and Stewart);

h) is a process easier for the ... making (Condillac, Wundt, James Mill, Bonnet);

and finally, i) is a direction of the organs or a motor action (Condillac, James Mill, Bonnet).

II The Psychical side was largely discussed. Here:-

a) Attention j) is not necessary to consciousness (Reid, Stewart) and so partially (Leibnitz, Wolff);

b) is the cause of a stronger sensation (James Mill, Herbart);

c) ... (illegible)

[illegible, read up, "sense-field"]

m) [illegible] giving rise to moral and emotional [illegible] (Aristotle, Hobbes, Descartes, Reid, Kant);

n) is a sensory faculty (Condillac);

o) is a motor faculty (Hobbes, Bonnet, de Biran, James Mill);

p) is important (Locke) or chief in memory (Bonnet);

q) is subdivided into observation and reflection (Locke, Reid);

r) is a presenting channel of consciousness to a less immediate [illegible] (Wolff);

s) is a faculty (Wolff, Condillac, Kant);

t) is a power (Helvetius);

u) is a State (de Biran, Herbart, Comte, Bain);

v) develops elementary impulses into sensations (Vico);

w) differentiates man from animals (Wolff, Leibniz, [illegible] Jacquier);

x) [illegible] enriches the higher from the lower faculties (Locke);

y) [illegible] man's mind from an attaining point of [illegible] ability and skill (Bonnet, Helvetius);

z) is [illegible] with [illegible]

Lavoisier, Tourneaud, Reid, [illegible], Hegel, Kant, Reinke, Stewart, Schopenhauer);

1) is active and voluntary (Hobbes, Leibnitz, Wolff, Hume, Brown, Lavoisier, Tourneaud, Reid, Hegel, Fichte, Stewart);

2) is directed more than to [illegible] (Wolff, Malebranche, Reid);

3) is a fixation of mind (Malebranche, Tucker);

4) [illegible] with greater results when one employs Wolff, Leibnitz, Herbart [illegible] and abstracts by the same (Hume, Condillac, Reinke);

5) [illegible] (Wolff, Herbart);

6) [illegible] by the [illegible] of one clear thought of distinct organs (Wolff, Herbart);

7) increases the mind's power (Townshend);

8) differentiates subject from object and leads from individual to universal (Hegel, Fichte);

9) [illegible] (Reinke, Wolff);

10) [illegible] the objects not to be examined (Reid, Schopenhauer);

11) [illegible] (Reinke);

ward, but the idea is to connect these of Reid, Hegel and
Schopenhauer as in harmony with the others.
In England, Germany, France and Scotland, from Hobbes
to Bain, Spencer and Bailey, there was recognized
more by all, excepting Hegel, that attention is influenced
in its direction by the desires and feelings, and that
what is to receive attention by will, excepting Condillac, that
by and through, that attention is a result of activities.
We have reached this Topically, the following
is the order of proofs:
1. Attention is physiologically a motor act, psychically a feeling of activity.
2. Attention is excited physiologically by impulses and, psychically, by images and ideas.
3. Attention is determined physiologically by the results of the registered impulses and, psychically, by interest and feeling.
For the physiological part nearly all the considerations are due to Huxley and Bernard. To the above must be added the following valuable ideas:
1. Attention as a time a threshold [illegible] Lewes.

2. Attention has a physiological effect in facilitating discrimination

7. Attention is the first step in intelligence.

8. Attention requires time for its operation.

jects at once has become limited to six as the greatest number, and we read by groups for the attention of only one object in consciousness at a time.

Chap III.

Phrenology from Thomas, Gall, Spurzheim, to the Present, or Attention.

We use the term at the head of this chapter to designate the ideas of a class of men, whether of period or of country, who have made it their business to study the subject of attention either in Philosophy, Physiology or Phrenology and who may be broadly distinguished from other psychologists and experimenters. It will be seen, in these pages, that their theories are dependent on the concentration of attention, & their success in collecting facts is as well as in classifying the results of their investigations and as showing how these results are to be made available for the conception or other. Since we now to ideas or attention in these latter days.

1 Philos. Sensuum, Eq. M; Rom. Instit., [illegible] Frag Fables V., p. 341-30.

2. "Inst. Pratics.," ; 4, 3. Sees, in vce, V. "Des Fraudes."

3 Psychologie, tom. I. ch. 2.

6 Philosophy, Sec VII × 5; Psychology, Chaps XXI - XXVII.

is many parts [illegible] Thus is attention a thing [illegible] exhibit.

We have had little to present from authors of the Associational Psychologists. Herbert Spencer is more occupied with genesis and evolution even in his Psychology and we can find nothing explicit on our subject. Where he regards all mental action as "the continuous disintegration and integration of states of consciousness", we suppose he [illegible] changing states [illegible] tions [illegible] set in the various ~~organic~~ changes of the organic impulses, [illegible] attention to depend upon the states called feelings. In this [illegible] sense impulses, we suppose attention might be one of the [illegible]

It is noteworthy that in the Associational School generally attention is regarded as a state.

[illegible]

[illegible]

[illegible] attention [illegible] based on the idea that matter itself is [illegible] a form of [illegible] [illegible], however, [illegible] that the system of Hartmann discriminates perception and thought, as well as consciousness, from impulse and [illegible], and yet does not [illegible] regarding attention.

It would [illegible]

[illegible]

[illegible] Fichte. The basis for consciousness and for [illegible] is the will and will is the operation of the [illegible]. By its own will the mind gives attention to, and has a consciousness of, the contents of an impulse.

In the theory of [illegible]

[illegible]

attention is the first stage in the [illegible]

[illegible] Psychologie, S. 142. [illegible] Psychol. [illegible] 332 [illegible]

and receiving impressions. The two points of view held are many are: 1) The necessity of original activation to self, consciousness and to all intelligence, and 2) that activity is an activity on the part of the mind.

We shall now consider the views of a number of thinkers on different aspects of [illegible] and psychology and their more purely [illegible] ...based on physiological and experimental ... We must pass by the earlier and [illegible] and the experimental methods of teaching and psychology ... necessarily meagre and [illegible] incomplete and fragmentary.

[illegible] ... attention has received [illegible] ... calling up the millions of [illegible] ... thoughts, and especially in the initiative activity in association and in planning and calling up the [illegible] ... Gratiolet pictured the activity as an [illegible] ... [illegible] ... [illegible] ...

[illegible] "Illusions" M. 365 M.

caused attention in its aspects in the physiology of the abnormal conditions of mind.

[illegible]

Leibnitz[2] regarded mind as a [illegible] physical [illegible], and defined attention as an arrest of this flow for a time, upon a determined object. He has not given [illegible] of what determines its object. Like [illegible], he [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] now from Plato and Aristotle, he made all reflection involuntary in that this operation is an attraction of the attention to some object in imagination or memory, [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] pertinent remark that inability to fix attention is a mark of [illegible] [illegible] [illegible] [illegible] to great iniquity.

H. Taine[3] [illegible]

[illegible] [illegible] [illegible]

[illegible] by the [illegible], [illegible]

2) Psych. nat. [illegible] 20. 3) [illegible]

Enunciated that stronger sensations is a stimulus [illegible]
attention is stimulated and determined by the
effort in the attention and the effort of attention is [illegible]

E. Pick is of opinion
that the [illegible] observation of these qualities [illegible]
and is established by the influence of Weber's law
[illegible] the stronger [illegible]
ing the weaker and the equal ones blending in one [illegible]
[illegible] the number of [illegible]
[illegible] memory of the conquests of the [illegible]
[illegible] exhibition of [illegible]
[illegible] of attention is one of the great aids to memory, [illegible]
[illegible] the extent of the struggle to [illegible]
[illegible] standing is [illegible]

"

James Sully[31] summarizes
[illegible] results of many of the experimental psychologists
and indicates his own conclusions in a number of points.
He connects the three mental processes, Feeling, Intellect
and Will, and the various nerve operations all together
in the one phrase of attention. Due to [illegible]
[illegible] receptive impulses give a vague feeling, and are again

31 "Memory", ch. on [illegible]. 32 "Illusions" ch. 8 & 9, Psychology, pp. 73-96.

the various cortical centres. [illegible] to get at the real process which is objective, we must look from the point of view of the nerves, for all of this is connected with the cortical centres. Looking from the standpoint of the New Psychology, the mind in acting makes centres in the physical cortex of the hemispheres. [illegible] physical processes and then centres of attention from the psychical view as that which gives us what attention is.

[illegible] does. He will not allow that force passes from ideas to the nerve substance, there is a chasm; we know only that an idea [illegible] the mind and accompanied by a feeling of effort becomes a fact. Keeping the idea in the mind is an act in muscular and there or may not in bodily movements. We [illegible] accept readily [illegible] Herbartian notions. He is [illegible] of will and says nothing of involuntary attention, it is [illegible] he would define the latter as a conscious and inhibitive observation of the conflict of ideas. Ideas act and appear as a [illegible] the associations and the [illegible] [illegible] attention. But there is also one of primary content of ideas, the act of inhibition which is [illegible] [illegible] [illegible]

[illegible] voluntary [illegible] and involuntary, [illegible] attention, [illegible] and involuntary. Voluntary attention implies ideas and a willing to attend, and the same effort [illegible] distinguishes it from the involuntary, this effort being volition and inhibition. It emphasizes the notion of discrimination and stress that activation of the idea fills the mind with it.

In the attention of observation we have an act which has "concomitants" so far as the adjustment and the movement of organs and muscles. In this species of voluntary attention, the process is more than willing the idea as idea, it is now the willing of the idea as fact, and in this idealizing of fact, the nervous and bodily mechanism corresponding in fact with idea, by ways we know not. Now, the voluntary willing of the idea as fact is the same as [illegible] it is a fact, and is distinguished by a feeling of effort — the other being a matter of the "concomitants" [illegible]

[illegible] The [illegible] of attention is connection with muscles and bodily [illegible] [illegible] [illegible] attention [illegible] idea [illegible]

[illegible]. The essence of a system of [illegible] a constant attention to one train of ideas or to one idea until it fills our mind.

James's theory is a derivation of the elements of attention from the physiological side and then a [illegible] over and [illegible] [illegible] of the [illegible] relationships from the side of [illegible]ness. In brief, attention is [illegible] and [illegible] to the inhibitions and innervations observed in the body, is involuntary in passive reflection and instinctive reflex action, and is voluntary [illegible] [illegible]. He might, perhaps, [illegible] the views of [illegible] in the [illegible] of the physiologists, but they are the latest [illegible] [illegible] from the standpoint of the [illegible] in the [illegible] earlier when he distinguished [illegible] of [illegible] mental effort and made attention, volition, belief and affirmation [illegible] synonymous and [illegible] the result of the [illegible] idea in the conflict of thoughts. [illegible] His later view gives room for a view of attention [illegible] is less the Herbartian State and more [illegible]

1) See [illegible]

[illegible] the views [illegible] in these and [illegible] will be included in the following chapter. We now turn to a review of the philosophical notion of attention ~~since~~ from the time of Fechner.

It might be expected there would be few physiological theories among the metaphysicians, but it is noticeable that the two branches of science influence one another, and we find here such bearings of physiology on psychology. On the side of the organism the following are the chief conclusions of the Philosophers for the last sixty years and more:—

1) Attention is a partly automatic (Hamilton) or [illegible];

2) is dependent on physical and nervous conditions (Lotze, [illegible]);

3) [illegible] (Murphy), motion of nerve and organ (Czolbe), motor innervation ([illegible]), or, Czolbe, Hartmann, [illegible]), or a reflex action (Sully);

4) depends upon variation of impulses (Bain), is determined by the associated impulses excited (Lotze), but [illegible] depend alone upon injuries (Lotze, Kirchmann, [illegible], [illegible] and others);

5) is an energy of nerves with intensity increasing as the number of impulses at one time (Hermann, Hall), and by more energy (Grey) in those nerves (Hartmann);
6) is raised by many impulses and by great rapidity of them (Lalor)
7) is manifested in inhibition and reflex action (James);
and finally, 8) acts effects, increases or modifies impulses (Wundt, Hartmann, Ulrici), prevents impression on organs (Grashey), limits and controls the organs (Gizycki, Jastrow), and the brain centers (Gizycki).

This summary shows that points in which by nerves the nerves have been classified since Reclam's time. Such for example are the errors that there is a "nervous flow", that there are impulses both ways with the same nerves, that there is a possibility of impulses in the organism in nerves and muscles, and that impulses can be initiated by the organism.

On the psychical side the nerves have many but may be collected around a number of central points. They are as follows:—

1. Centers of sensitivity — a view derived only from nerves and sense organs and [illegible]

10) is a [illegible] activity (Self, Sensini, Hamilton, Emmett, Becker, Nicosia, Cupchik, Rosenberg, Klein);

9) is a conscious activity, eye-catching, [illegible] Sarnier, Sensini, Kirchmann, Kupfer, D. H. Neale, Stewart, Pauly), or is [illegible] non-voluntary or voluntary [illegible] Lang, Arnold, Zajonc, Lamers);

12) is a state (Bain), a relating activity (Selye), a [illegible] vicious, restrained activity set free (Selye), a primary act of mind (Jeffrey, Ward), an activity of the whole mind (Ward, McCosh, Sully), or consciousness of Time, Place and degree [illegible]);

13) is a process in self-objectivication (Rosenkranz);

14) is observation only (Jeffrey), [illegible] Sopranos, also, Bernier

[illegible] observation (Hickok, Bacon);

[illegible]

16) gives the person and the object as [illegible] Rosenkranz, [illegible]

17) differentiates man from animals (Harris) or [illegible] in their requirements (Hamilton, Bertini);

18) is the basis of knowledge — almost generally admitted;

19) is [illegible] the action of [illegible]

Sully), [illegible]

Bain, Hartmann, Ribot, Calkins, ordinarily [illegible]

a) is the basis of consciousness (Fichte, Hamilton, Hartmann, Sully, Bunsel, Hartmann, Dr Riddle, James and others);

b) is spiritual and the basis of moral and beliefs (James);

c) may be given to several objects at once (Hamilton, Kirchmann, Sully), and is a narrowing down of consciousness upon fewer objects (Hamilton, Bunsel, Kirchmann, Ward, Ribot);

d) [illegible] (Bain, Sully, and Sully James), or a feeling of motor movement (Ward);

[illegible]

[illegible] and memory (Kirchmann, Baisment, Ribot, Ward, Ribot) [illegible] ejaculations and ideas (Hamilton), and, in a [illegible]

It is possible that many of the [illegible] attributes in reality [illegible] which they would [illegible]

Ch. Xvii. IV

Theories of the Physiologists and of the Experimental Psychologists from the time of the Reformation, on Attention.

We shall group together the views of such Physiologists as have expressed themselves definitely on our subject and thereafter what has been [illegible] Physiologists engaged in [illegible] work of any kind. We may also include under this first division the views of some men who are not advanced Physiologists but whose habitual views permit them [illegible] to be regarded as Physiological Theories.

Henry Holland regarded Attention as involuntary and Voluntary, or Impressive, or Impressed by the objects of sense, and Attention as very much identical with the sensation itself. Dismissing the theory of Hartley, Voluntary Attention is more properly Original or Spontaneous Attention, and original or spontaneous Attention is [illegible] Physiological [illegible]

[illegible]

being as involuntary, leads to consciousness, is attention in consciousness with concentration of the currents and feelings, differs from reflection, and is essential for registration in memory and for knowledge.

The views of David Ferrier[5] are now [illegible]
uses the term "faculty of attention", and describes a non-voluntary [illegible]
controlling them.

[illegible]

[illegible] itself. It is like the focusing of the eye, the concentration of [illegible]

5. Functions, ch. XI, sec. 17

Dr. David Ferrier - Sketch of visual connections and
similar to the attention given, in simulation, to
and reading by the eyes; [illegible] of
to be objects attended; 4) comparative craniology shows an
increased capability to fixed attention with increased size and
prominence of the frontal lobe, in the order of mental life. In
all this, Ferrier connects attention with intelligence as had been done,
and makes it to be the point of differentiation of the higher
from the lower faculties, while he gives a [illegible] to the
localization of memory and [illegible] to the
lobes.

On the whole, Ferrier's ideas may be summarized thus: Physiologically, attention is a rapid nervous reflex in the normal voluntary form, and [illegible] in the
[illegible]; it is the stimulation and activation;
and is an adjustment of organs and muscles through the cerebral motor centers especially through those of the frontal lobe; psychically, it is the general application of consciousness in a non voluntary attention giving the intensity as the [illegible], is a concentration of consciousness in a voluntary form giving [illegible]

[illegible]

[illegible] W. James[1] was not afraid to depart from the traditional dichotomy of attention and consciousness. He devoted a whole chapter to attention, [illegible] it, while he used the word consciousness synonymously with impulses. He took up first the view from the side of consciousness. In some respects attention and consciousness are one — "attention represents consciousness", "the conscious state is an act of attention", "attention means concentration", and so on. However, the two are not altogether identical — "to have sensation and to be conscious is the same thing", "to have sensation and to attend to it are two different things", and "attention is the direction of the consciousness not of [illegible] consciousness itself, and inattention [illegible] unconscious condition. He curiously called recollection and [illegible] simply the attentive states of feeling. Attention is a [illegible] and other activities, and [illegible] reminiscence the psychological [illegible] attention [illegible] the latter by the former. In process of thought, [illegible] [illegible] copy of [illegible]

6. Problems I and V. [illegible] Principles, Simple, and Complex; Physiology, II. 1-6; etc.

consciousness [illegible] [illegible] and [illegible]
[illegible] power [illegible] visible to the subject only. In
this view from consciousness, there is always more [illegible] to
be distinguished from an actual increase [illegible] of muscles, in
the various [illegible] cases of attention to processes of thought
[illegible] [illegible] [illegible] [illegible]
there [illegible] is [illegible] real increase. Experience alone does away
with conscious attention, while experience and interest [illegible]
increase it, as explained above. Certain feelings, as [illegible]
[illegible] [illegible] [illegible] [illegible] [illegible]
attention, or capacity for the same, in certain directions.

[illegible] [illegible] [illegible] [illegible]
This side of the subject, where there are two [illegible] and
[illegible] of attention in rapid succession, the conscious
mean rapidly alternating between attention from [illegible] one and then
from the other standpoint. Finally, in this psychical sense, is
one of the directions in [illegible] ideas which excite motor im-
pulses, the other direction being to activity of the muscular
organs; while in consciousness of one [illegible] effort.

[illegible] other word) the view is from the end of atten-
tion, [illegible] [illegible] [illegible]

...motion more, he explained it by saying that attention ...
as well as to itself. For instance, the stimulation ...
of nerves of taste do not produce a motion or sound, ...
this does place only when the cerebral centres receive, and ...
that may not take place because the stimulus is too weak or ...
the centers are otherwise stimulated; but with the reaction ...
there is a relief of attention whose discriminating ...
organized again in connection with the impulse to ...
essence of a lower. This is well seen in reflexes ...
often giving reflexes to touch which would not have ...
at first impelt on the hand is felt after it is seen.

On the whole then, Spencer asserted that attention ...
not produce original impulses, and does not always pro...
duce after images and memory. The explanation of this fact ...
in directions which we will not here summarize. In ...
2. and in the two phases of attention we have ...
say that the extremely obscure and delicate adjustment ...
of attention gives us the subtle powers for ...

brain-play, and the "diagram" is a sort of indelible record and counterpart of nervous current in the cortex, and which is called a peculiar physiological activity between cerebral molecules and fibres. Some specific motion in this diagram leads to activity of the ego, and this is the germ of attention. Once so carried here a Hegelian idea into physiology.

Attention has many manifestations, and it is chiefly a prevention in the brain series, and in the centers anterior, of the impressions which muscular action would make on the organism. We have here also the doctrine of Leibnitz in that both impulse and sensation are regarded as composite—made up of an "aggregation" of minute impulses and sensations. This "aggregation" takes place for every case and the work of inhibition may be either to prevent the organ or to prevent all the impulses, like pondering thought, or to prevent only such a small part as would keep the impulse below the threshold of consciousness. Sometimes, instead of affecting the organs, attention prevents impulse by blocking up the course of the sensory fibres with a counter impulse sent out from the end

[illegible] machinery of the nervous system is adapted for concentration of attention on [illegible], [illegible] to [illegible] by association; this associated mind is aided by incentivated [illegible] in the cortex and which remains started in the train of thought acting as nerve cells of new activities; the whole process explains how impulses from without can not enter into the centers when [illegible] these centers are engaged in abstract thought and we give in concentrated attention on internally originated currents. He gives quite a new explanation of how attention is even carried out by the fibres and molecules without any failure, - it is not failure. [illegible] "excessand failure" and on the other, the will or the whole [illegible] attention is [illegible] to give it a strength above all possible opposition or distraction. Imagination is thus given a most useful provision.

Another virtue of attention is that it secures the simple "dissociation" of the action, fibres from [illegible] from all others. Break the connection, and the attention is complete. It is, however, not limited just to [illegible]

[illegible] consciousness and [illegible]

"Cues" play a great role in Dewey's system, and deserve attention. The muscular activity connected with it, to not need the association of the fibres from the organs, for connecting one between the senses facilitates and guides all the attention in the track. Attention is only necessary in any new [illegible] effort to get all the fibres & the required senses into full play and set up the "cues."

Concentrated attention can not be given in dreams, and one reason is that there is then no auditions of words, for words are the greatest "cues" in starting or in "dissociating" the nervous "diagrams" which assure attention. He explains the case of news and visions as follows:— The "aggregating" activity of the fibres and molecules get upset and set at such a rate that there is no longer any connection from the steadily occurring motions, but sudden changes in the occurring motions of will or factory sized or even the voice of the brain modification is assured by the dream or vision. So the more attention [illegible] without [illegible]

[illegible] correlations of brain molecular changes [illegible]-tion, and that sensation is always in consciousness. [illegible] may be the physiological correlatives of attention, he appears to apply the term itself to the sensation in consciousness. Here attention lies in will and is concerned in every perception, and it may be deduced that Bastian teaches that this one final form of sensation is present in all our conscious acts of knowing, feeling and willing. [illegible]

[illegible]

Ego. All mental acts are sensations in consciousness and attention is a phase of every conscious state. All questions about activity and passivity are thus kept out of the question of attention and ~~are~~ referred to the actions of nerves and muscles.

Chas. F. Taylor's[1] theory is incidental in a medico-psychological work on Pain. He [illegible] attention and thus admits the possibility [illegible] sensation at once. [illegible] conscious [illegible] attention, and [illegible]

1 Sensation [illegible]

... "volitional centre of action" in the mind besides ...
... the Ego. This Ego, however, has considerable ...
... power. Theory of life is the result of the true sum and the ...
... repulsion of elements; and the ... those systems building ...
... up great [illegible] and [illegible] from one idea; and ...
... which naturally and logically explains attention in the ...
... same simple way.

... the experimental psychologists, a brief summary will be ...
... appropriate, that we may hold together what has been gained. ...
... It is significant that the great number of physiologists ...
... and neurologists have nothing to say on our subject. It is ...
... also to be noticed that, so far as our review goes, no new ...
... idea has been advanced on the psychical side of action in ...
... the theories given by the physiologists since the time of ...
... Descartes, while the same men have made considerable ...
... physical views advanced by others. In summing ...
... up we find that has been advanced regarding attention on the ...
... side of the organism.

... Attention is a reinforcement action, 2) ... initiated ...
... [illegible] ...

muscular inhibition, 2) a reversal of the nervous impulse with muscular inhibition, 3) a nervous impulse for muscular activity or attention, and an inhibited nervous reflex with muscular inhibition, to awaken interest or center for voluntary attention, and 6) an inhibition of the nervous reflex and inhibition of the center giving impulse of muscular action, with an inhibitory efferent impulse and a free arrangement of the nervous system for the future. Since physiologists teach the flow of the blood to the parts used, we may say, as the full expression of all these processes; that [illegible] Attention is a composite affair, involving often [illegible] form of an inhibition of the impulse by the higher motor centers, and attended with muscular innervation or inhibited muscular innervation. This [illegible] only describes the circumference of the field, there are yet important facts within the area. We shall now [illegible] any light on [illegible] of [illegible] subject by the review of further experiments and

Chapter I.

In a full account of Psychology
of the experimental psychologists we can not
at present find at their service. We may, however, briefly
sketch two, namely Fechner's view of
the organism and Wundt's view of consciousness just to
show how the recognized topics in the theories of these thinkers
are reviewed. We must however that additional elements
which enter into the interest, the science, and the charm of the
new Psychology, the element of definite experiment
on the living subject in various conditions, and the re-
sults of these experiments. We will not undertake to give
an account of these experiments but will briefly
indicate the conclusions and the facts accompanying them

In J. M. Baldwin's "Handbook" he says of the science of Psychology "a method of experiment and of measurement
of [illegible] in the [illegible] more, we may at
least [illegible]

...at we ... could ... me ... here.

... seem ... to have had no ... of ... and different kind ... the physical phenomena ... which it is directed. He was ... that the stimuli ... increase in energy ... at the same ... attention to them ... pulses may diminish or disappear. ... many impulses ... [illegible] ... causes strongly ... perceived through attention to it. ... is directed ... them. He made new distinctions in the ... of sensibility, calling the sensible ... and the ... sensibility. ... a ... a ... a ... a ... should be measured in this way. Without clearly defining the sensorium, he taught that impulses coming ... attention is directed to them. He ... the word "threshold," limited ... to ... ient in psychology. Stimuli and ... which will have ... [illegible]

...ion and ...
...ation,

...ness ...
...ts of interest or attention and tends ...
...ummary of the new process which the ...
...tion of the past. Attention is given in ...
...something like that which we already ...
...ation of the former ones and in this ...
...n started to approach this just as it is in ...
...ness excites approach tion in us excites attention, and the ...
...degree of the former is the degree of the latter, and so, reversing ...
...the usual method of considering approach tion from the ...
...of attention, so views attention from the point of approach tion.

...tors, such as stimulus, impulse, stimulation, ...
...disposed organs, nervous structure, ...
...the central energies, as well as sensations ...
...and sensibility. As well exhaustion to weaken the ...
...of organs, as the increased sensibility in attention, as ...
...the watchful alertness in the central energies and the ...
...nervous tissues. As we go to the ...

[illegible] in consciousness correlative with the [illegible] functions, and to organic stimuli, and to [illegible] more remote objects and feelings.

Wundt's

Wundt's theory we shall here consider is Carl Stumpf's.[13] He has been conducting investigations in the domain of tone sensations, and claims that attention is more intense and is fuller when it is connected with any other organ of sense, while consciousness, he makes attention the ultimate basis, is activity of mind in intellect, and at the same time he regards it as identical with interest and feeling. The excitements attention are various: — the stronger a stimulus, the impulse must pass along to the organism, the sensation that seems [illegible] interesting, and the sensations which [illegible] the least [illegible] attention he gives the following: the [illegible] constant as found in normal and normal state [illegible] may [illegible] observation, practice, fatigue, and the state [illegible] may be measured in terms of [illegible] to [illegible] require the sensation which [illegible]

13 "Tonpsychol," [illegible]

the words "field" and "focus" in a bolder sense, to discuss, not the object, but what I am going to call the question of the nature of attention. With James and Broadbent, I prefer to speak of a "span" of attention and this may be divided over a wider field, limited to a few objects or focussed down to one. This I intend to keep both in the organism and in consciousness and its objects. Like Titchener, I accept the old attention always stimulates the centres to fill up the focus with an image of the object, and this must be the idea that attention holds a sensation longer. What is "content of" this sensation is always a very limited object, but object is better because for the reason that the point or quality taken in focus has a closer union with all the other points or qualities of the object in sensation.

The work of attention is chiefly two: 1) to unite the mind's closest connection with the "content of" sensation; and 2) the better union of this "content" with every other. But ideas are presented under the same way as this [illegible]

16 "Syst. Psy." Vol. I, § 12 and 13.

shadow, not functional, and of comparatively short duration. The relation of the presentations into the "field" and the "inner circle" give respectively the perception and the apperception of the unity.

We will now attempt a comparison between the inorganic and the organic sides, with a keen analysis of the fully developed elements. From the logical point of view, attention and distinctness, although both need for their existence clearness and dimness of consciousness, the former with definite but intensity of focus to the area of attention and selection, the field of apperception being, but of limited extent. In many ways the field and focus of attention within the environment and the forces of the organism, although of equal importance, remain the same, and each element of a focus or field may be attended with successive fixations. The inorganic begins to many objects at once and the "inner circle" can no more [illegible] in the doctrine that we can not simultaneously attend to several objects at once but agrees with it that there is no limit to the number of forces and elements which may be combined in one. The idea is misleading. The [illegible]

cite to muscular adjustment. First is the [illegible]
the motor action in the adjustment of organs and [illegible]
most favorable condition is when the motor innervation [illegible]
neither precisely to the degree of stimulation, and [illegible]
clearness to the apprehension, when there is a sufficient [illegible]
degree of stimulation. Disharmony between the motor and [illegible]
ity, wherein the latter is in excess, gives dizziness. Just what
the case would be when the motor is in excess he does not
say, but, as he says the concentration of consciousness [illegible]
[illegible] the feeling of effort, [illegible]
excessive muscular innervation heightens the [illegible]
presentation and secures better attention.

The feeling of effort exercised in recalling images
and ideas shows that the muscular innervation is [illegible]
in the form of attention exhibited in recollection. In a
case of exhaustive attention to external objects, the [illegible]
is entirely dependent on the muscle innervation, while [illegible]
Past experience shows to be necessary for the memory [illegible]
and this adjustment is fully and readily [illegible]
attention is [illegible] organism gives [illegible]
opposite,— a relative [illegible]

It is interesting also to notice in connection with the theory and the results as stated that "the sensory nerve fibres which conduct to the nucleus, and within certain limits the more intense excitation."

Attention is voluntary or involuntary. In the latter there is no conscious activity of will and the direction of attention is limited to that of the one presentation, or the presentation is so strong that action can not be considered. In the voluntary form the direction of attention is limited to one or a few among various presentations. He says, as does Jansen, that attention to the idea of a movement of will is the condition for the carrying out of the act. [illegible] Practice serves to make attention and act easy. [illegible] Another great factor in attention is the interest [illegible] and will is the ability of the person to

sight — and the interval between is also explained in the following way: The intervals which exist between the successive crests of the sound-wave, are measured by the same unit as the intervals between the crests of the light-wave, and the difference between the two sets of intervals is the explanation of a ring's origin. Further, the effects are such that the interferals for sound and sight are coincident, that is to say the forces being made up of a number of similar things recurring in the time represented graphically between the crests of two successive waves above the line. "A" might represent the curves for sound alone, "B" for sight alone, and "C" for the combination.

It would be impossible to recite the results of the experiments of the past year, and the most we can do is to refer briefly to the conclusions and the completed investigations of the year. These are discrete both physiological and psychological.

On the subject of attention, the following points are interesting:— In simple reaction, the attention time is estimated by the recorded motor impulse and observation. The time for the transmission of sensory impulses to the central organs and for the entrance of the sensation into clear consciousness. By "perception" is meant the recognition of a stimulus as belonging to a certain class of objects.

that combined, is a process of discriminating presentations of many objects and is a narrowing down and concentration of consciousness, is connected with interest, is passive in the association processes and active in all others, is voluntary when there are only simple strong presentations and is voluntary by an inner activity among several presentations as also in recollection, is aided by memory in cases of weak impulses, may be out of harmony with the adjustment of the organs, is a rule for in memory and in association and in the blending of impulses of similar or disparate organs, and it also gives the order of succession in consciousness; —

[illegible] to motor innervation in memory and in deduction, is conditioned in the time of operation under auditus, visus, reaction time in calculation forms by a readiness to [illegible] in the muscles, simple presentations, is always active and discrete, and it contributes a readiness to motor innervation by impulse. [illegible] also, claim that Wundt teaches the new feeling of innervation when there is no motor innervation. [illegible] what

with its degree of activity is the subjective element of attention, as the stimulus with its degree of intensity is the objective element of apperception. It is remarkable that Wundt omits the subject of inhibition in connection with attention.

The view of H. O. Lotzeiner[18] is worthy of a place here. It is a middle ground between the theory of Wundt and of Ribot. He does not take the Leibnitzian but the Herbartian view. He says, "We cannot, at present at least, in any better way explain attention than by regarding it as a mere effect of the relations of ideas to each other, as I have said, in the mere degree of the vividness with which they appear in consciousness." He finds that any combination of these degrees and any condition of ideas in consciousness would necessarily affect attention and its concentration. He says, "I refer to Lotze and the Great faculty of attention, but in his view, he regards attention as a mechanical and only as a conditional activity, as does Bradley, and he adds to Herbart's idea this — that attention withdraws from the consciousness all things except the favored object, whether it be the intensity of other sensations, of other conditions, or of other ideas than the elected sensation, which is then the only existence in the

[18] Brain, Jan., 1884, p. 431 foll.

d'Action as is the attention more intense.

With Dromiguières, he makes all consecutive mental action depend on attention. The shoulder work done during this state is because the central inhibition closes all but the direct course to the point concerned and thus prevents all efforts of energy. He puts forward especially that Expression of attention is per second nerve of Control. Only it is attended by the young Man by the aged, by tender lovely remarks, especially devoted ones, and every case in every expression, subject will to act of attention. He admits that along cerebellum is an effect of the movements confirm the conclusions of Ferrier for dogs. [illegible] cannot infer this Thought [illegible] attention [illegible] Lifting effect with its complementary peripheral [illegible]

[illegible]

Sinclair continues the conclusions of Ferrier and Shore since that attention has to do with the motor region, so far as from 2-3 well recorded cases of various lesions in the central lobes.

[illegible]

of the physiologic state, but we have omitted to include such as are better treated in a dissertation on the effects of ablation. [illegible] a number of [illegible] physiologists in America and in Europe who have made observations concerning ablation, in connection with their experiments, but it has not been our intention to present their theories on the subject. In fact we shall not include any further reference in this thesis except to mention briefly the theory of one who has written more than any other on this subject.

[illegible] theory of ablation and his theory is the most recent though incorrect [illegible] will briefly consider all theories of ablation, and especially Hamilton and Brunet, all of whom consider it under the two forms of non-excitatory and voluntary. Both Brown, Séquard and others regarded the testicles as the director of all function. But this is neither given so place to attention in giving evidence as to the views of Brown and it is said that the [illegible] accompany all castration. This view is probably [illegible] and ablation was conclusively proved by [illegible] theory. [illegible]

Stout's interesting section "would seem to be included in the non-voluntary, while for Titchener it is not distinguished from the pre-conscious and "sporta neous." According to Ferrier spontaneous attention and the natural use of the [illegible] and [illegible] while Ribot [illegible] to "internal events", thus according [illegible]

As Spontaneous and voluntary attention are [illegible] is very striking. As to causality: both are [illegible] and exhausting [illegible] but [illegible] determined by feelings, and neither concerns anything. As to difference: Voluntary attention is derived from spontaneous attention; its process is [illegible] movements; the first is determined by [illegible] the latter by a feeling of [illegible] the first gives the object [illegible] latter, the other gives the object [illegible]

under a true ideal; the former is of inward, final use, the other of outward chance; the first is a studied and severe and ready adaptation. The scattered results of short-sweep attention is polyideism in consciousness, while that of voluntary attention is monoideism, hence a constant flow of ideas and the other a tendency to a single one. The change from spontaneous to voluntary attention is a change from potential into kinetic energy, as pointed by Volpe. The latter is sociological [illegible] social life.

He will not call attention a state in consciousness, as James, for he contends that would be to make it abstract. It [illegible] is by [illegible] of which the movements, [illegible] are reduced in the particular case, and while the sensation in consciousness is only an accompaniment.

His great distinction between spontaneous and voluntary attention is that [illegible] latter has the new factor of the former [illegible] the central intellectual field and here is seen the value of [illegible] Ribot and Oberstein who, however, [illegible]

produces this, and the reason is to make [illegible] of
many subjects.

Genetically, Hunter's Monitor comes from the [illegible]
in the struggle for existence. A concurrence of fortunate
accident to lead early animals or savages to foresee that an
[illegible] would [illegible] and to [illegible]
[illegible] ultimately become [illegible]
and evolution. Prior is of general attention;
further [illegible] to [illegible]
[illegible] attention, secondly, reason, but the latter based
[illegible] on the [illegible] of [illegible]. So is [illegible]
in his [illegible] attention on needs.

Much has been said re [illegible] attention, and
Ribot considers it on the subjective side much as did his
[illegible] and Phillips. [illegible]
[illegible] the essay [illegible] and the real is but a reinforcement or emphasis of this.
In the motor side there is a [illegible] innervation of the
motor centers and of the muscles, and a less [illegible]
necessary to give the inhibition.

Ribot presses the worry of motor [illegible]

food, [illegible] exercise and pure air, and [illegible]
[illegible] drugs, excesses and diseases, or [illegible] ~~pathological~~ con-
ditions [illegible]. Finally, whether attention be reflex
or inhibited reflex action, it would not make it
[illegible] and self-caused reflexes [illegible] attention, though it
attention to reflexes and their modifications.

[illegible] ~~of~~ [illegible] ~~of~~ [illegible] attention
[illegible] reflex movement or its inhibition according as it
[illegible] or retarding, with the latter as a covering cause
of [illegible] towards [illegible] only and with a feeling of
[illegible] in consciousness, instead of [illegible];
[illegible] ~~of~~ [illegible] ~~of~~ seeking [illegible] ~~of~~ [illegible]
[illegible] ~~of~~ effort; [illegible] attention is granted by
[illegible] and retractions and the [illegible] by [illegible]
in the organism; voluntary attention exists actively in
[illegible] parts of the brain and narrows the field of con-
sciousness, while it itself is initial in the brain; and, final-
ly, attention is no permanent power, like memory.

[illegible]

[illegible] has been done in the previous chapters and in the first part of the IVth, a general summary is here given.

I. On the physiological side, the psychological engaged experimentation regard attention as:-

1) a motor effort generally, exciting the organism and having the [illegible] (Ribot, Lehmann, Brandt, Dumont, Oberstiner, Ribot);

2) accompanied with bodily and mental conditions (Ribot, Lehmann, Oberstiner, Wundt, Ribot);

3) a complex fact and a general cause of many [illegible] (Ribot);

4) having efficiency limits (action limits) (Oberstiner, Wundt, Ribot);

5) [illegible] (Wundt, Ribot); and [illegible] action limits (Oberstiner, Wundt, Ribot and others);

6) [illegible] and "le sacre de travail" (Wundt);

7) discrete in its effects (Wundt, Ribot), and fixing [illegible] and action" and "le sacre de travail" (Wundt, Ribot) [illegible]

through act of movement, (Stumpf, Ribot);

7) Sensory impulse combined with motor innervation, in their voluntary forms, (Harris) or in all forms (Wundt);

8) an act of inhibition (Helmholtz, Ebbinghaus);

9) motor innervation in one form and inhibited motor in [illegible];

and finally 10) entirely a motion in all its elements (Ribot).

Some of the authorities quoted have not expressed themselves on some points and so the consensus of conclusions is not as full as it perhaps might be. It may be said that all attention is here reduced theoretically to some form of motor impulse in nerve and motor act in muscle, and that there are gradually arising two schools one of which, like Bonnet and Wundt, considers motor innervation the central factor, and the other of which, like Lange and Ribot, regards motor inhibition the chief characteristic.

On the [illegible] practical side there are no great discrepancies [illegible] among the experimentalists [illegible] the philosophers. Here, attention is viewed as:

[illegible] Capacity [illegible]

(2) a wide variety of reaction times, varying, as a rule, with the complexity of the image or idea, the stage, &c.;

(3) discrete in time, hence all (or most) given to sides or centres of mass, i.e. not making a continuous presentation (smooth) and giving a single (and effective) total;

and finally, (4) points among the estimated, the more, the greater the mass of the sensations).

On the physical side there is then a general condition that attention is a heaping of effort for intellectual ends and under the guidance of interest, that it is a massing down of consciousness to a greater intensity, and that [illegible] and which are of less interest, — at the expense of the less-interesting of the act.

Conclusion.

It is assumed that [illegible] and to find [illegible] that [illegible] agree in many important [illegible] and the [illegible] value in the new work of the discussion [illegible].

Biography.

The writer was born Feb. 29th, 1852, near Middleburg, O. His parents' names are Henry Harrison and Catharine (Holgamott) Bell. He early education was about five months, and then five winter terms in the District School, 1853-63; a term of teaching there in the winter of 1865; two terms of study at Vermillion Institute, -65; a term of teaching at Holmesville in the winter of 1866; and a term of mixed studying and teaching at the Millersburg College 4 yrs and one term, receiving there the degree of B.A., in 1871; and attended the Wittenberg Theolog. Seminary three terms, receiving his ordination to the ministry at Decatur, O., 1879.

The years 1875-77 were spent in British India, in the [illegible] Mission, [illegible] Lahore". In 1877 he received the degree of M.A. from [illegible] and while [illegible] of the "Punjab Bible Society" and [illegible]

[illegible] care of Rev. [illegible] in "Broadway Tabernacle", and in my [illegible] Sunday School class, for [illegible] years. In 1883, at Madras, I professed "Peace with God through our Lord Jesus Christ and the Gospel".

I entered the Johns Hopkins University, the graduate Department, in 1886, in which I have been for three years studying in the departments of Philosophy and Psychology under Dr. G. S. Hall and H. H. Donaldson, and in the Sanskrit department of the division of Oriental Languages under Dr. M. Bloomfield, with much stimulation in the study of Ethics from Dr. G. H. Howison.

I am under many obligations to all my Instructors [illegible] early appreciation of their efforts as well as for their esteem for Christian character.

Truman Lawrence Kelley

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[illegible]